An Analysis of Markets for High Oil Corn

by

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Introduction

- Agricultural biotechnology & plant genetics deliver value-enhanced grain to end-users
- High oil corn is not a Genetically Modified Organism (GMO)
- Traditional commodity system is unable to recognize value-enhanced products
- Increased risks and returns for supply chain players
- Distribution of value/profits among players

Objectives

- Discuss strategic & managerial issues for supply chain players
- Analyze risks and returns for HOC growers, handlers, and end-user for hogs & poultry
- Examine impact of HOC on the traditional commodity system

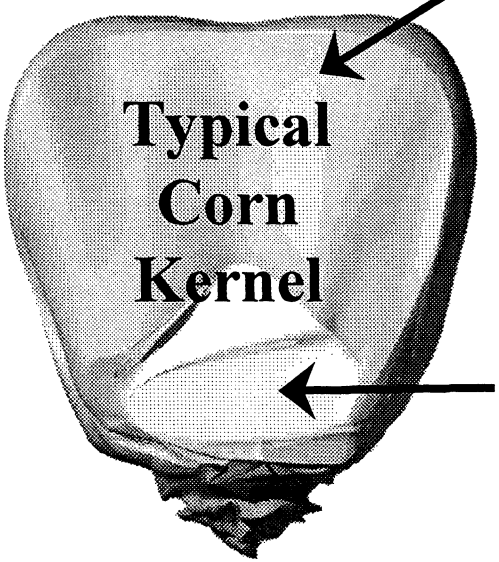
Methodology

- Review of previous studies and reports
- Selected interviews with biotech firms, corn farmers, elevators, millers, and end-users in Ohio,1999
- Selected interviews with university researchers
- Collected data from government sources, agribusiness trade groups, and private firms

Results

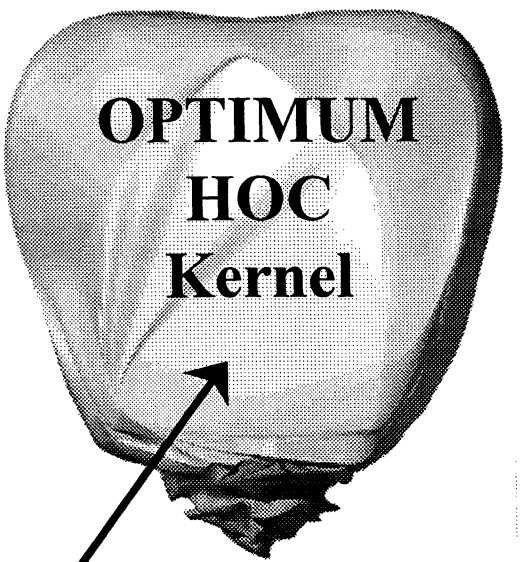
- Grower's Risks and Returns of HOC versus Normal Oil Corn (Table 1)
  - Assume comparable yield, but may be lower
  - Higher costs of production
  - Increased risks (less drought/disease resistant)
  - More management expertise required
- Grower's HOC Return at Different Oil Levels (Table 2)
  - Higher oil content equals higher premium

Typical Corn vs Optimum® High Oil Corn



Endosperm:
Starch &
Low Quality Protein

Embryo:
Oil & High Quality Protein



IT'S OPTIMUM™

Larger Germ in High Oil result in:

- **Increased Oil Content**
- **Improved Protein Quality**

The Future of Value-Added Grains

Market Potential Estimates ($ Billions)

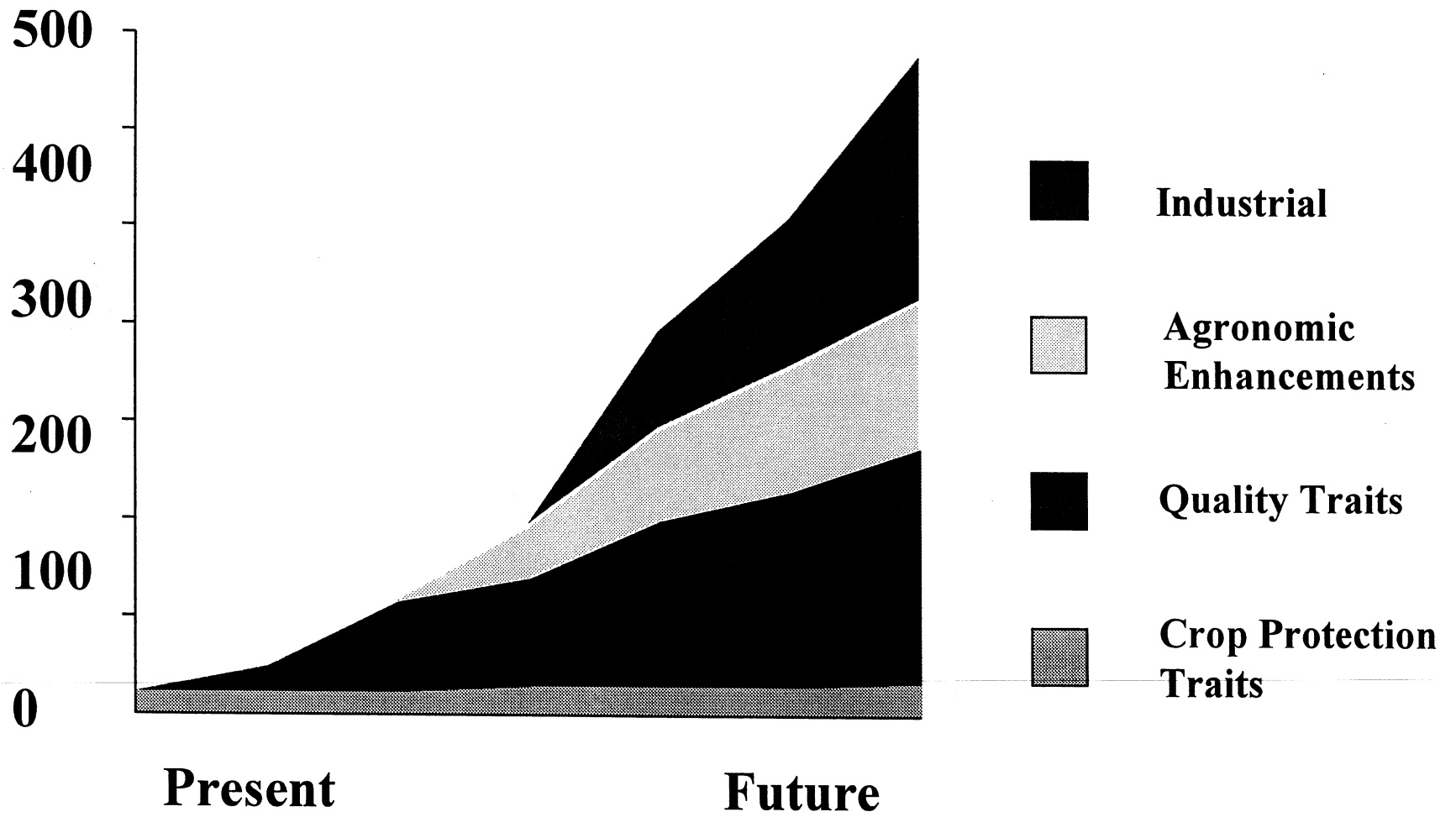


Table 1: High Oil Corn versus Number 2 Yellow Corn: Returns Per Acre

Key Parameters:	High Oil Corn	Number 2 Yellow Corn
Acres	1.0	1.0
Yield Per Acre (bushels)	130	130
Spot Price (Per bushel)	$2.50	$2.50
Premium (Per bushel)	$0.17	0
Oil Content	7.0%	3.5%
Income:		
- Revenue	347.10	325.00
Incremental Expenses:		
- Technology Fee ($30/unit)	11.11	-
- Seed Cost ($90.00/unit; 1 unit - 2.7 acres)	33.33	-
- Traditional Variable Costs	131.67	165.00
Returns Above Variable Cost	170.99	160.00

Source: Primary Data, Field Research

Table 2: High Oil Corn's Return Per Acre at Different Oil Levels

Key Parameters:	High Oil Corn	High Oil Corn
Acres	1.0	1.0
Yield Per Acre (bushels)	160	160
Spot Price (Per bushel)	$2.50	$2.50
Premium (Per bushel)	$0.11	$0.25
Oil Content	6.5%	8.0%
Income:		
- Revenue	417.60	440.00
Incremental Expenses:		
- Technology Fee ($30/unit)	11.11	11.11
- Seed Cost ($90.00/unit; 1 unit - 2.7 acres)	33.33	33.33
- Traditional Variable Costs	189.00	189.00
Returns Above Variable Cost	184.16	206.58

Source: Primary Data, Field Research

Risks and Returns for End-Users

- HOC return for hog and poultry producers (Tables 3 & 4)
  - More energy
  - Easier processing
  - Higher quality protein
  - Higher returns

Table 3: Poultry Producer's Break-even Premium for High Oil Corn (HOC) based on Price of Normal Oil Corn (NOC) and Alternative Prices for Fat

Price of Fat ($/lb.)	Amount of Fat (lbs.)	Price of NOC ($/bu.)	Value of HOC ($/bu.)	Break-even Premium ($/bu.)
$0.13	1.85	$2.50	$2.74	$0.24
$0.16	1.94	$2.50	$2.81	$0.31
$0.25	2.08	$2.50	$3.02	$0.52

Key Parameters:

a) HOC - 7.0% oil content

b) If NOC prices decrease to $1.80/ bu. the break-even premium increases by 3 to 4 cents per bushel

c) Break-even premium = Value of HOC/ bu. - Price of NOC

Source: KS Akey Inc. Lewisburg, OH

Phone Interview with Poultry Nutritionist

Table 4: Hog Producer's Break-even Premium High Oil Corn (HOC) and Normal Oil Corn (NOC)

Oil Content	HOC (lb)	NOC (lb)	Fat (lb)	SBOM (lb)	NOC Equiv.Cost (100 lbs)	Value of HOC/bu. (56 lbs)	Break-even Premium (56 lbs)
5.0%	100	96.0	2.0	2.0	$4.82	$2.70	$0.20
5.5%	100	95.5	2.5	2.0	$4.88	$2.73	$0.23
6.0%	100	95.0	3.0	2.0	$4.94	$2.76	$0.26
6.5%	100	94.5	3.5	2.0	$4.99	$2.80	$0.30
7.0%	100	94.0	4.0	2.0	$5.05	$2.83	$0.33
7.5%	100	93.5	4.5	2.0	$5.11	$2.86	$0.36

Key Parameters:

a) Price of Normal Oil Corn (NOC) = $2.50 per bushel of 56 pounds.

b) Price of Fat = $0.16 per pound

c) Price of Soybean Meal (SBOM) $215.00 per ton

d) NOC equivalent cost per 100 lbs = sum of (NOC lbs.*2.50/56) + (Fat lbs.*0.16) + (SBOM lbs *215/2000)

e) NOC equivalent cost times 56/100 = Value of HOC bushel

f) Break-even Premium = Value of HOC bushel minus Price of NOC

Source: Hord's Livestock Co. Inc.

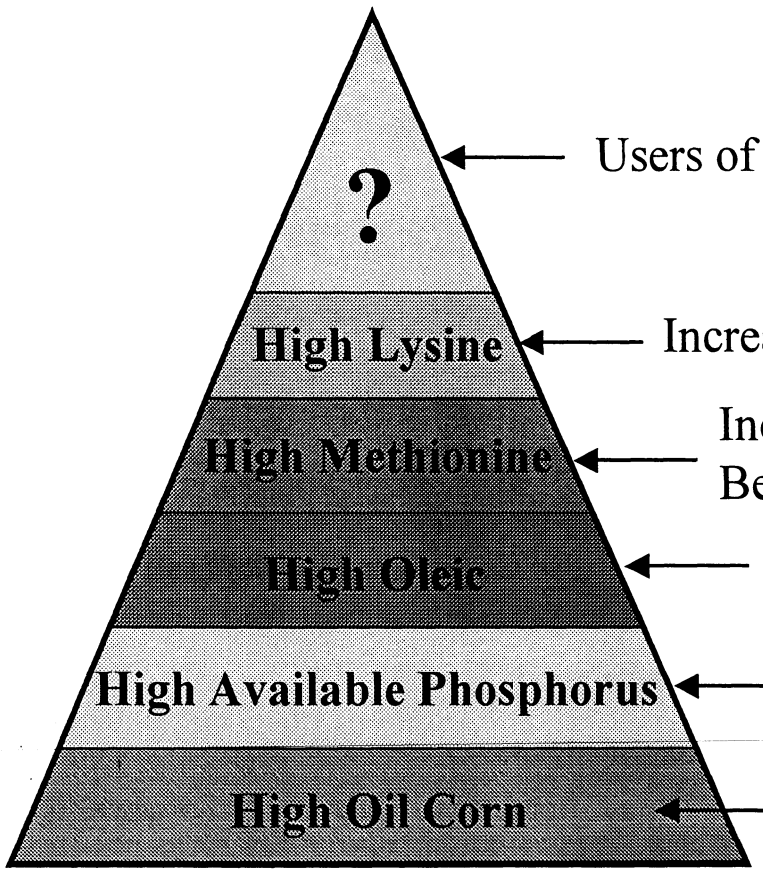
Challenges for Grain Handlers

- Identity preservation for end user requires:
  - New more expensive testing equipment
  - Smaller, more specialized storage bins
  - More specialized transportation & handling
  - Increased coordination and management with grower and end user
  - A dual marketing system may emerge for these value-added products

Agricultural Biotech. Firm Issues

- Distribution of Value Among Players
  - Profitability for all players
- European Union Regulations
  - GMOs may not be allowed in EU markets
- Intellectual Property Rights
  - Protection of patents
- High Oil Corn Is Just the Platform

High Oil Corn is Just the Beginning



Users of Corn and Science Will Determine

Increased Lysine in Corn & Environmental Benefits

Increase Methionine in Corn & Environmental Benefits

Improved Meat Quality & Increased Shelf Life

Increase Digestible Phosphorus & Environmental Benefits

Energy, Protein, Vitamin E & Milling Values

Conclusions

- Biotech firms, seed dealers, growers, handlers, and end users must be more closely coordinated
- Biotech firms face more patent and regulation issues and increased competition
- Growers face higher risks & need higher returns
- Grain handlers face higher costs & improved management
- HOC increases value to end users
- Future success for all players will likely require stacking of new traits on HOC to gain higher profits
- Success of HOC depends on value being distributed to all players
- Consumer acceptance will be critical issue for success